

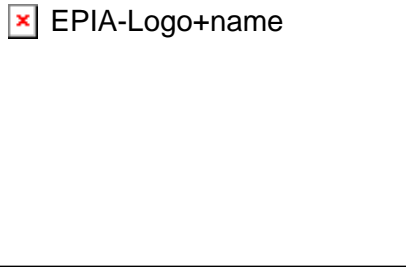
✘ EPIA-Logo+name

PV overview and perspectives

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Deputy Secretary-General
Policy Director



Outline

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- **Who is EPIA?**
- **Key market figures**
- **EU policy framework**
- **Proposed Directive on the promotion of the use of renewable energies**

1. Who is EPIA?

EPIA is the largest association worldwide representing Solar PV electricity sector.

- Exists since **1985**
- **Objective:**
 - promote PV at national, EU and worldwide levels
 - assist its members in the development of their businesses in EU and export markets
- **152 members: 123 full + 28 associate**
- 123 full members : manufacturers on the overall value chain
- Budget 2008: 3 millions €
- Secretariat in Brussels: 13 people in 2008
- 8 Board members elected for 4 years
- President for the next two years

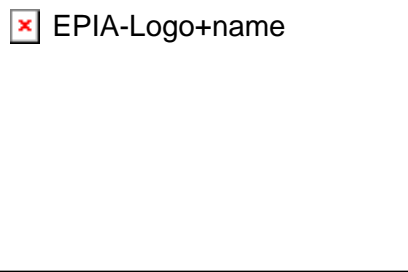
EPIA and its members

EPIA represents **95% of the photovoltaic European industry**,
and **80% of the Global photovoltaic industry**

- Silicon feedstock: **Wacker, REC, DC Chemical ...**
- Wafers and Ingots: **Crystalox, Scanwafer, Pillar, Podolsky, PV Silicon ...**
- Cells: **Q-Cells, BP Solar, Isofoton, Shell Solar, SolarWorld , Sharp...**
- Modules: **aleo, Schott Solar, Photowatt, Suntech Power...**
- Systems: **Tenesol, Naps Systems, Conergy, Phoenix, ...**
- Inverters: **KACO, SMA, Sputnik, Sunways, Fronius...**
- Cabling: **Multi-contact...**
- Equipment and services: **Applied Materials, Centrotherm, Oerlikon, Stangl, IB Vogt, M+W Zander, Vesuvius ...**

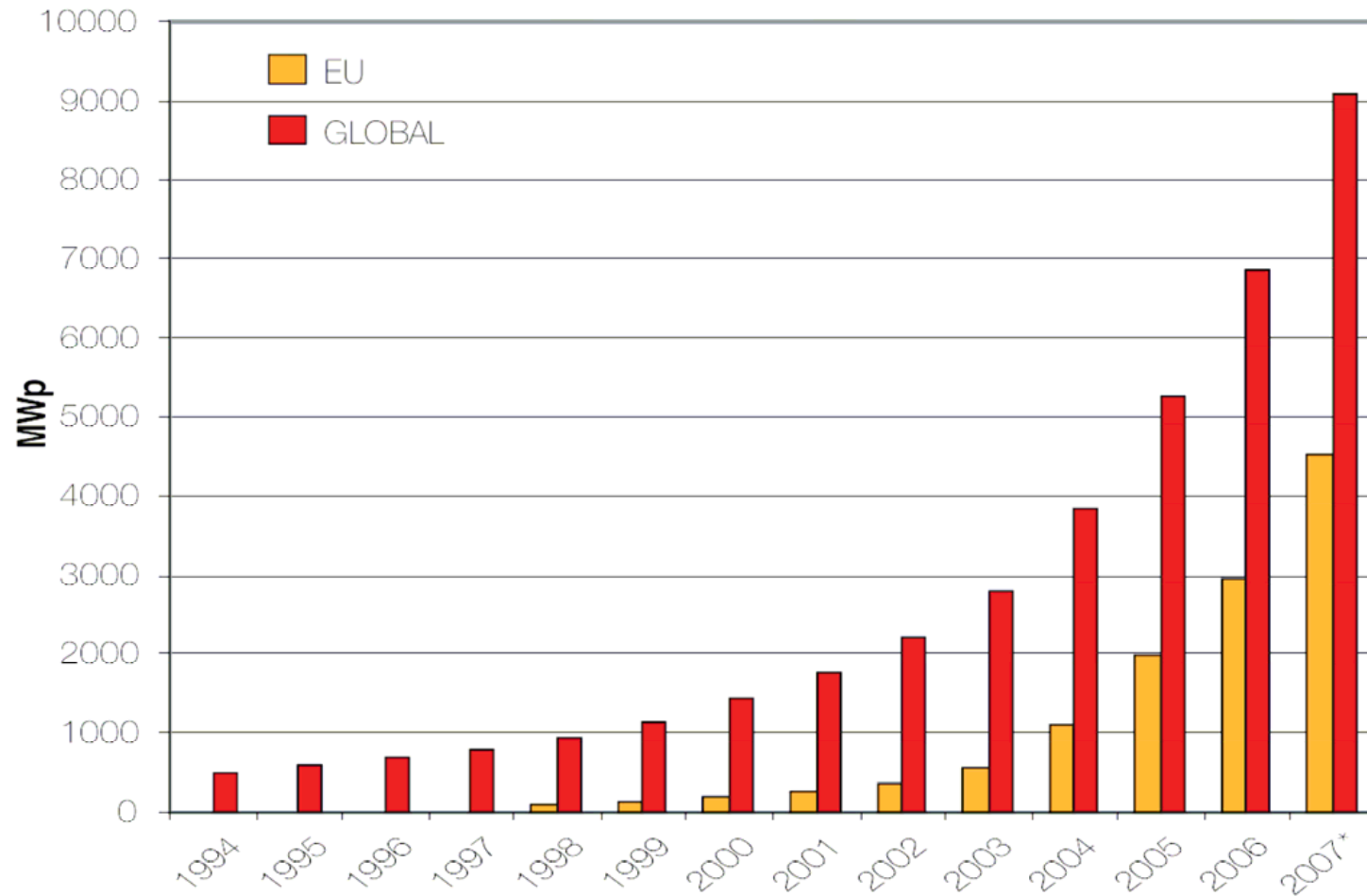


Components manufacturers (97)	Systems, Consulting, R&D (54)
Full Members (97)	Full Members (28)
<p>Aleo Solar (DE), Adept Technology (DE), AGC Flat Glass (BE), Applied Materials (DE), Atersa (NL), Arcelor (LU), Astra (KY), August Krempel (DE), Baoding Yingli (CN), Bangkok Solar (TAI), Belval (CH), Bisol (SI), BP Solar (ES), Centrosolar (DE), Centrotherm (DE), China Sunergy (CN), Crystalox (UK), DC Chemicals (DE), Dow Corning Europe (BE), DuPont (FR), Dyesol (UK), Edisun Power (CH), Elettronica Santerno (IT), Engcotec (DE), Elkem Solar (NW), eMat Technology (US), Energy Solutions (BG), Enersys (UK), EniPower (IT), EPV Solar (US), ErSol Solar Energy (DE), Evergreen Solar (DE), First Solar (DE), Fronius (AU), GE Solar (US), Guardian (US), Helianthos (NL), Heraeus Holding (DE), Hydro (NW), Isofoton (ES), Isovolta (AU), KACO Gerätetechnik (DE), Konarka (US), KPE (KR), Kyocera (DE), Leybold Optics (DE), Meyer + Burger (CH), Martifer (PT), Mistubishi Electric Europe (DE), Mondragon Assembly (ES), Multi-Contact (CH), OC Oerlikon Balzers Ltd. (LS), NPO QuintTech (RU), Photovoltech (BE), Photowatt Internatioal (FR), Pillar (UA), Podolsky Chemical (RU), Danfoss Solar Inverters (DK), PV Silicon (DE), Q-Cells (DE), Samsung Deutschland (DE), Sanyo Component Europe (DE), REC Scanwafer (NW), RENA Sondermaschinen (DE), Renergies (IT), Saft (FR), Saint Gobain (FR), Schott Solar (DE), Scheuten Solar (NL), Sharp Solar Systems (DE), SGL Carbon (DE), Siemens (DE), Singulus Technologies (DE), Solar Cells Hellas (GR), Solar Energy (RU), Solsonica (IT), SMA Technologie (DE), Solar Century (UK), Solar Plus (PT), Solar World (DE), Solland Sollar Energy (NL), Solvay Solexis (BE), Sputnik Engineering (CH), Stangl Semiconductor Equipment (DE), Sunpower (US), Suntech Power (CN), Sunways (DE), Systaic (DE), Topsil (DK), Trina Solar (ES), Vesuvius (FR), Wacker-Chemie (DE), VON ARDENNE (DE), Umicore (BE), United Solar Ovonic Europe (DE), Würth Solar (DE), XL-Telecom (IN)</p>	<p>3S Swiss Solar Systems (CH), Acciona Solar (ES), Carmanah (UK), City Solar (DE), Conergy (DE), Ecostream (NL), Ecotecnia (ES), Enfinity (BE), ESI (DE), Goldbeck Solar (DE), GP Solar (DE), IBC Solar (DE), IB Vogt (DE), IT Power (UK), M+W Zander (DE), NAPS Systems (FI), NaRec Development Services (UK), Phönix SonnenStrom (DE), Saft Power Systems (FR), Solar Solutions (CA), Solar Technologies (UAE), Solar Ventures (IT), Solar Electric (FR), Solaria Energia (ES), Tenesol (FR), Upsolar (CH), Wager & Co Solartechnik (DE), WIP (DE)</p> <p>Associate Members (26)</p> <p>ADEME (FR), Apollon Solar (FR), APREN (PT), ASIF (ES), Assosolare (IT), BSW (DE), CRES (GR), Dexia (FR), ECN (NL), EDF (FR), Enerplan (FR), Fraunhofer (DE), GIF1 (IT), Holland Solar (NL), IM2 Systems (ES), IMEC (BE), INES (FR), Kosolco (DE), PV Cycle (BE), SEMI (US), SER (FR), SMBC (UK), TNC (CH), Trama (ES), Yole (FR), Swissolar (CH)</p>

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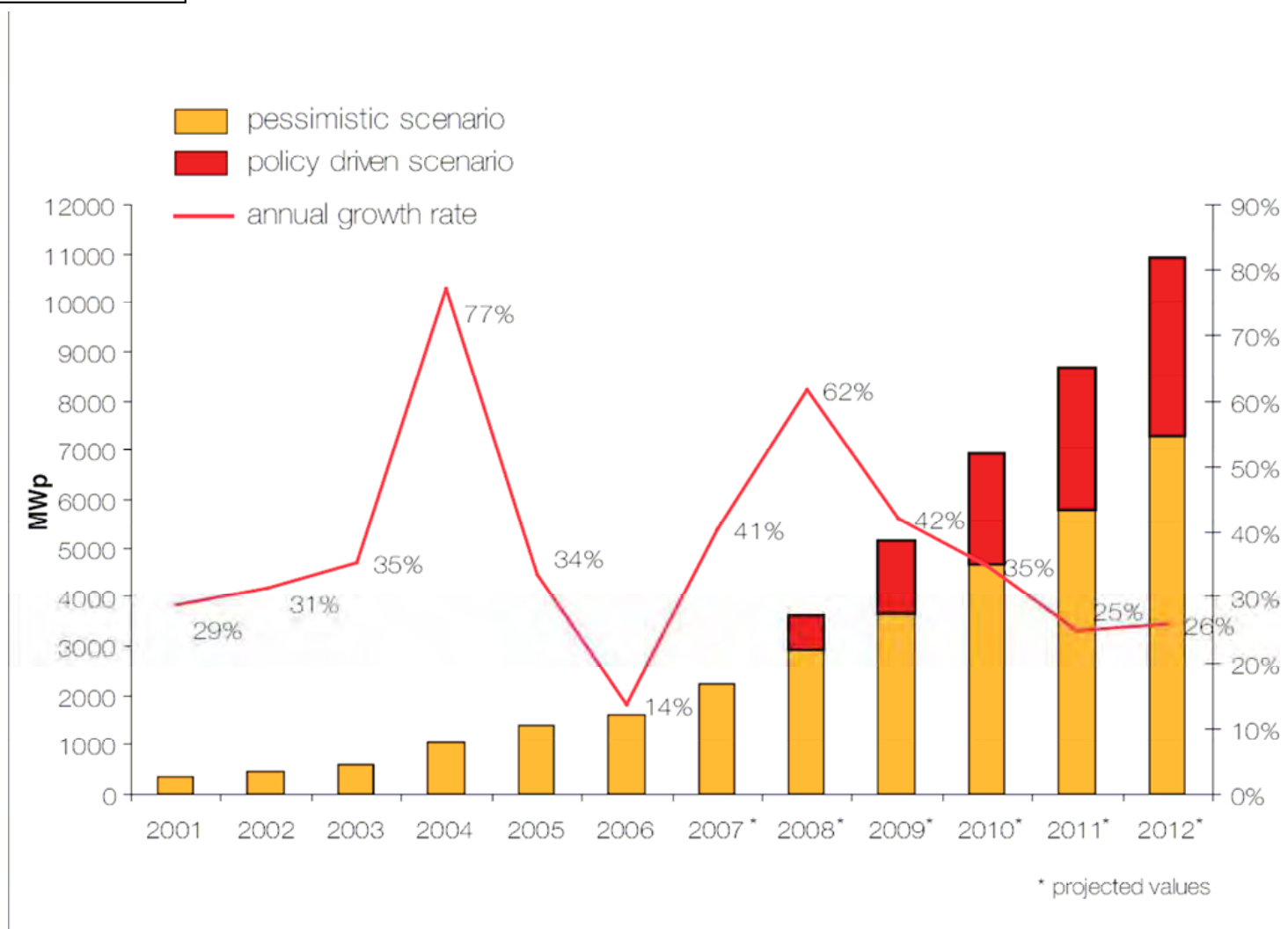
2. Key market figures

Historical development of cumulative installed global and EU PV capacity

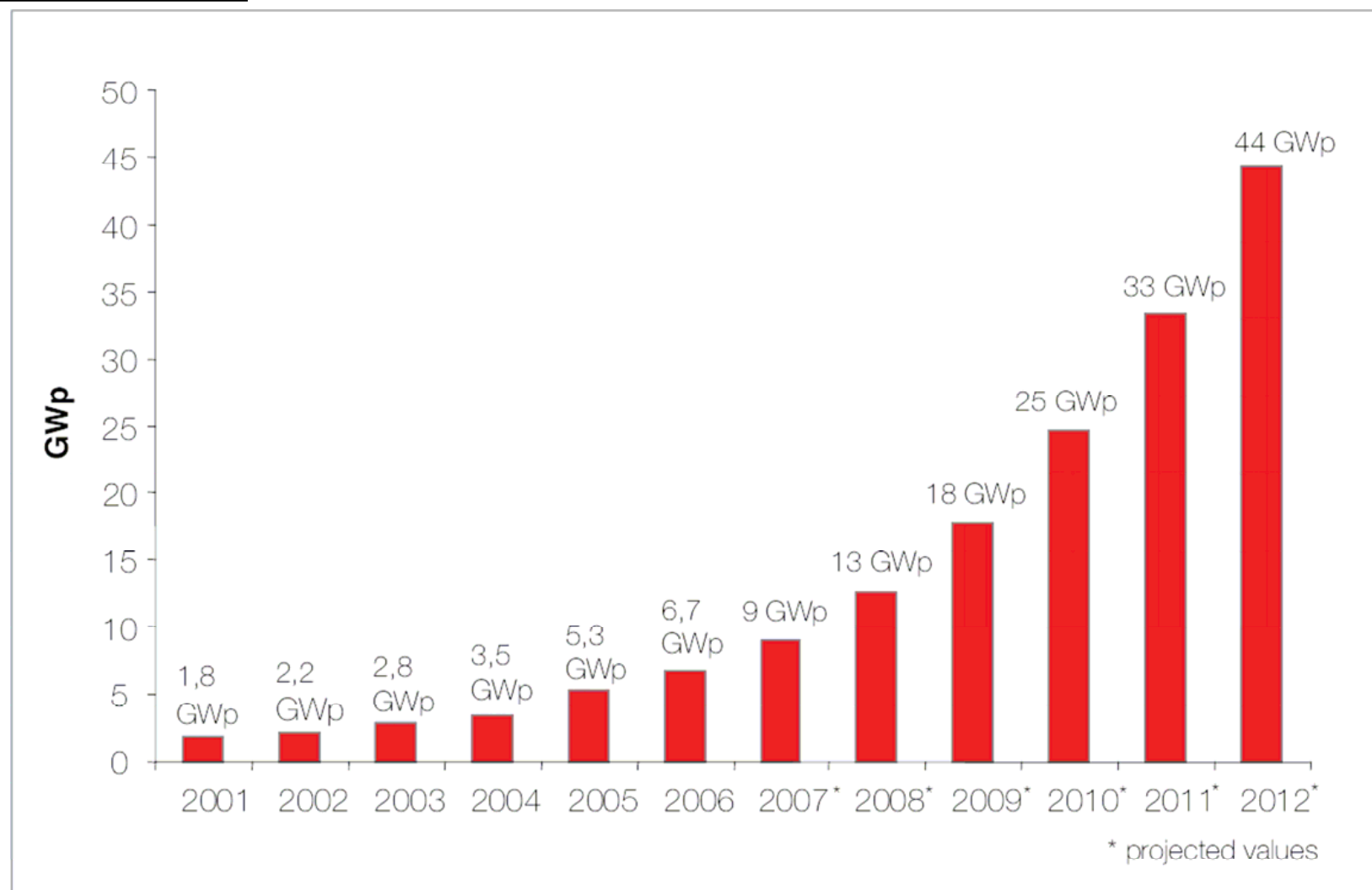


*estimated values

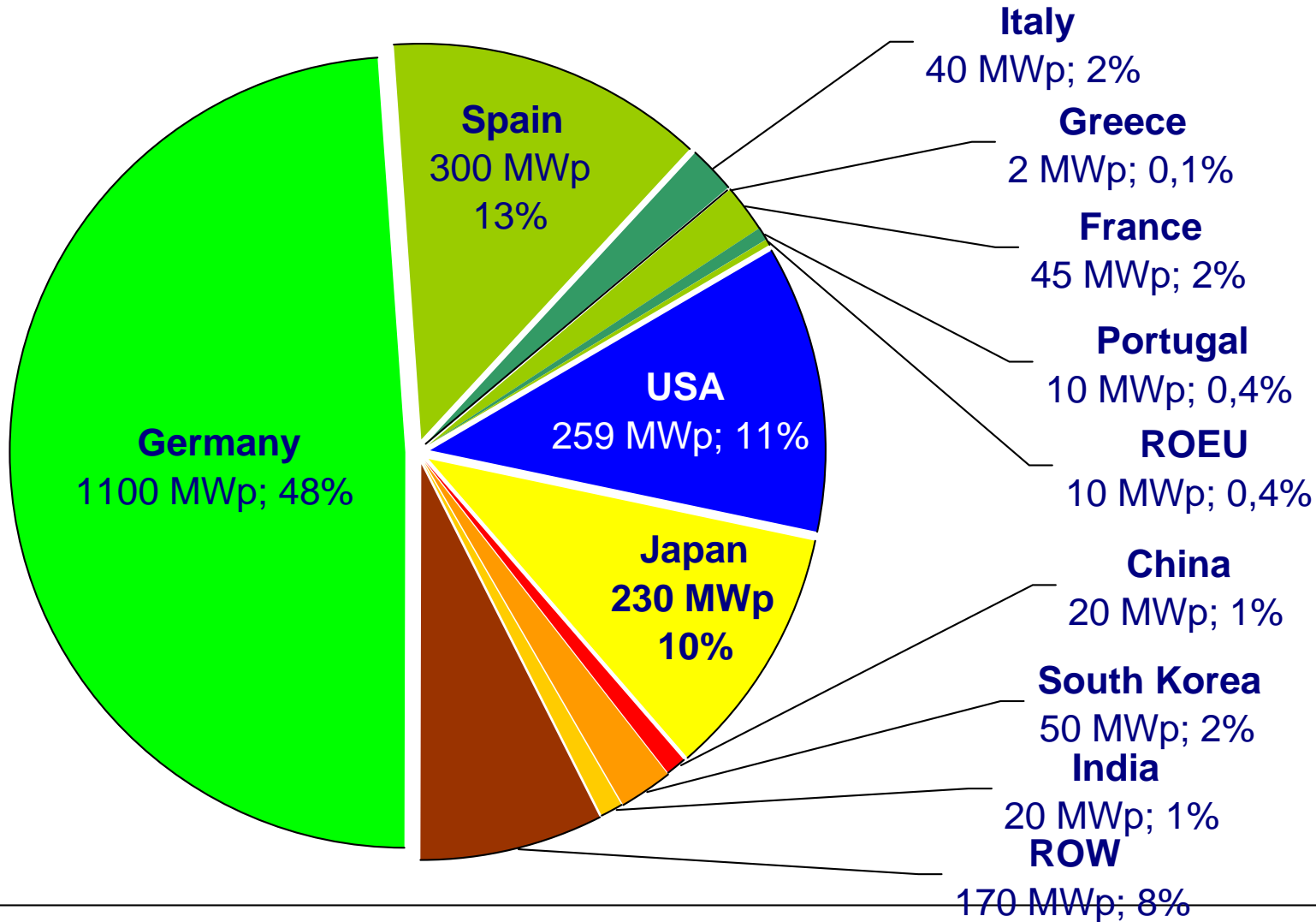
Annual market (MW) and annual growth rate (%)-EPIA scenarios



Global cumulative PV capacity (Policy Driven Scenario)



Photovoltaic World Market



Successful strategy

- More than €10 billion were invested in PV systems since 2000
- More than €2 billion were invested in manufacturing plants since 2000
 - About 50 companies produce silicon, wafers, cells, modules and inverters
 - Modern and automated production lines
 - Strong technological development and increased R&D activities
 - Improved efficiency, improved products
- Drop in costs **for PV systems of**
 - approx. 25% from 1999 to 2003
 - 60% from 1991 to 2003
 - price reduction of 5% since mid 2006



Image: Q-Cells

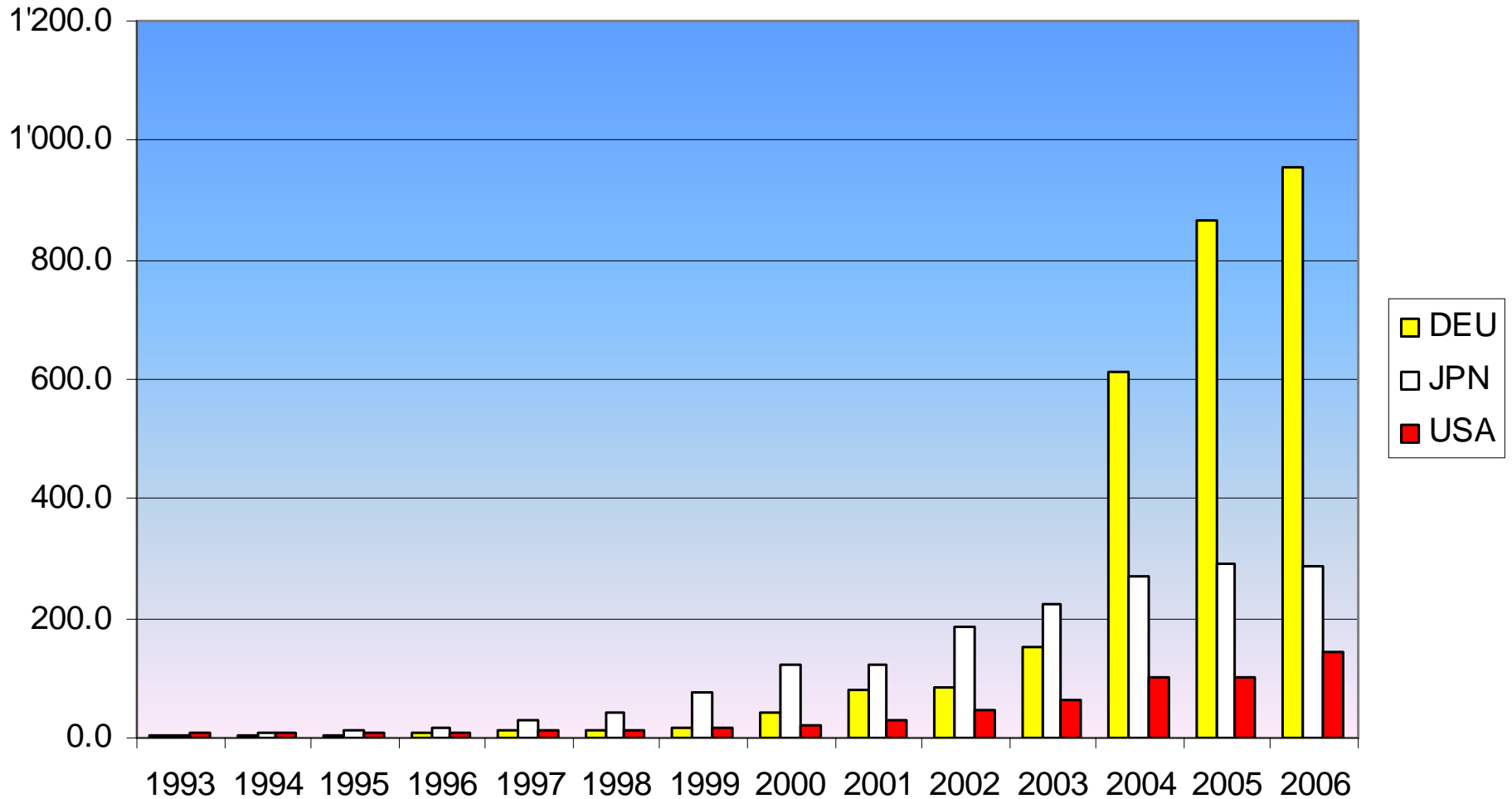


Image: Aleo

Selected markets (1)

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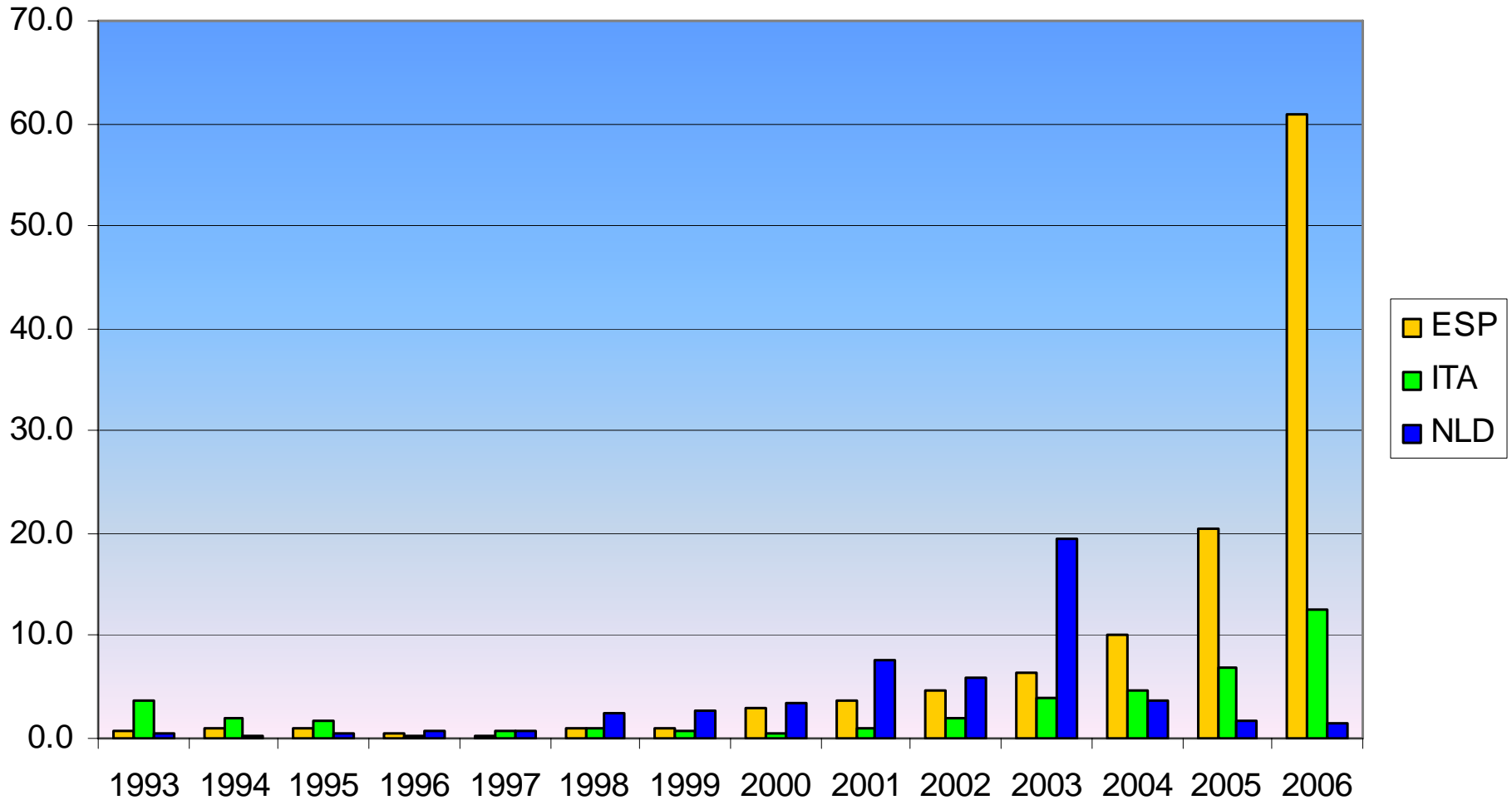
Annual growth [MW]



Selected markets (2)

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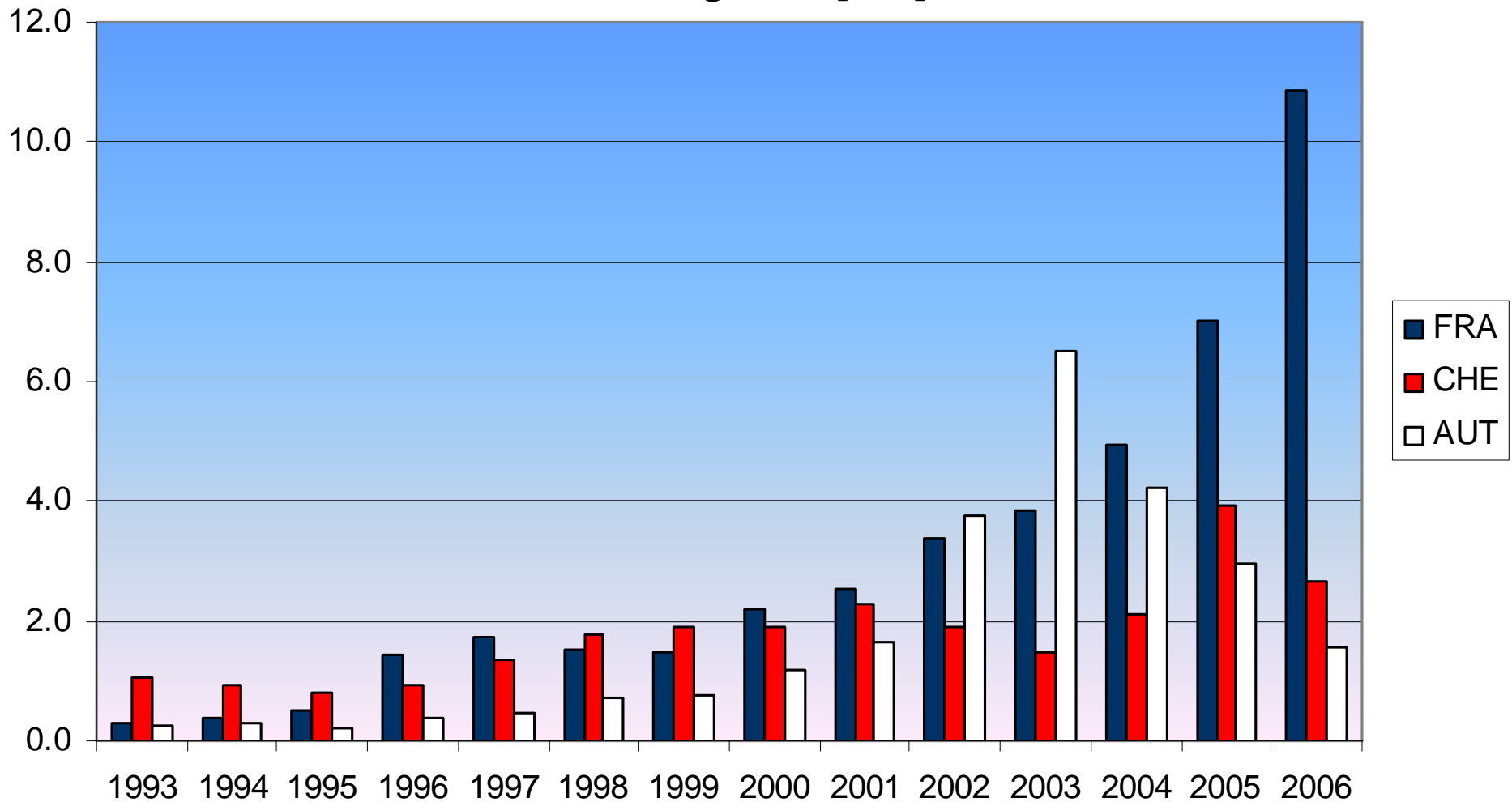
Annual growth [MW]



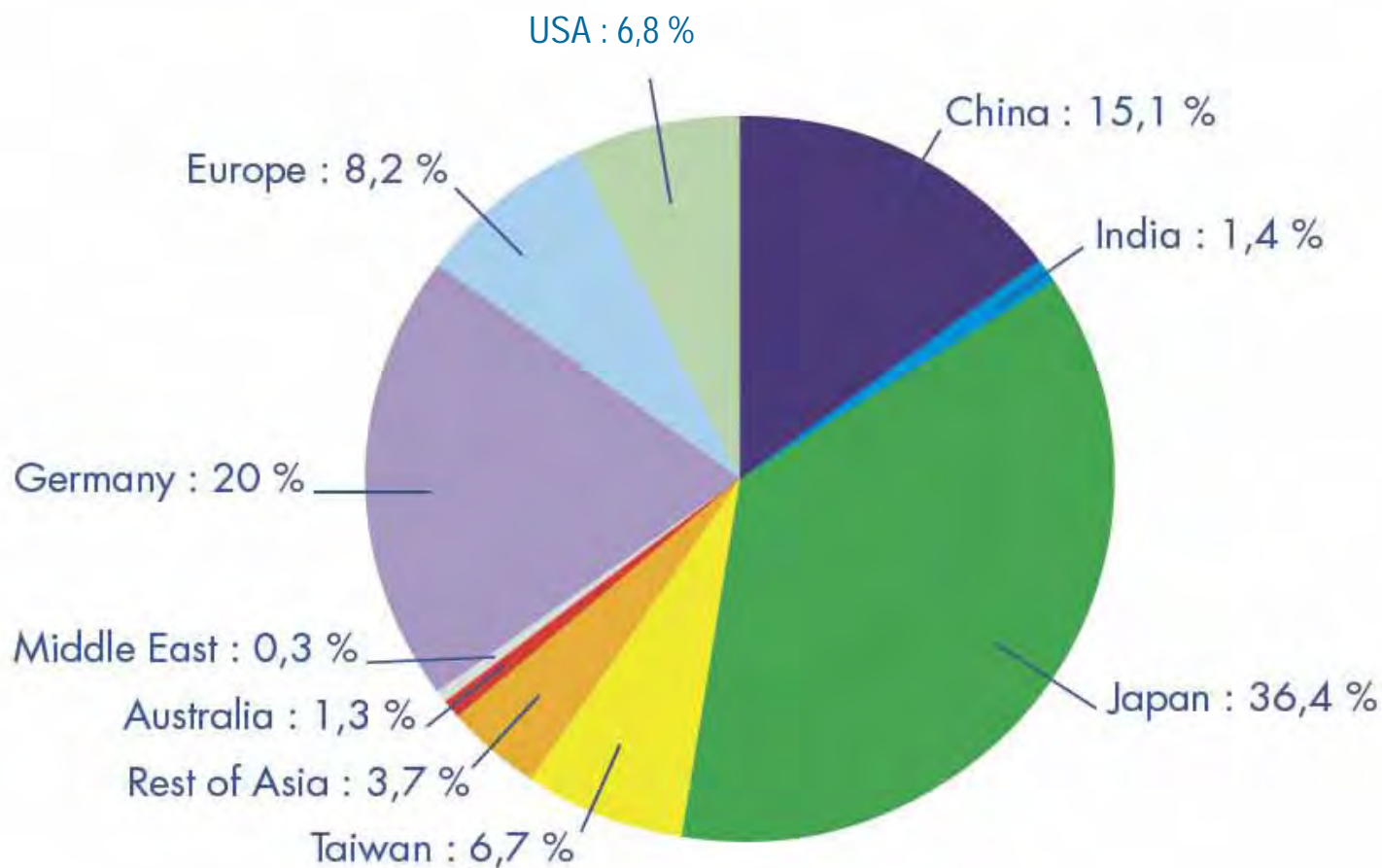
Selected markets (3)

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Annual growth [MW]



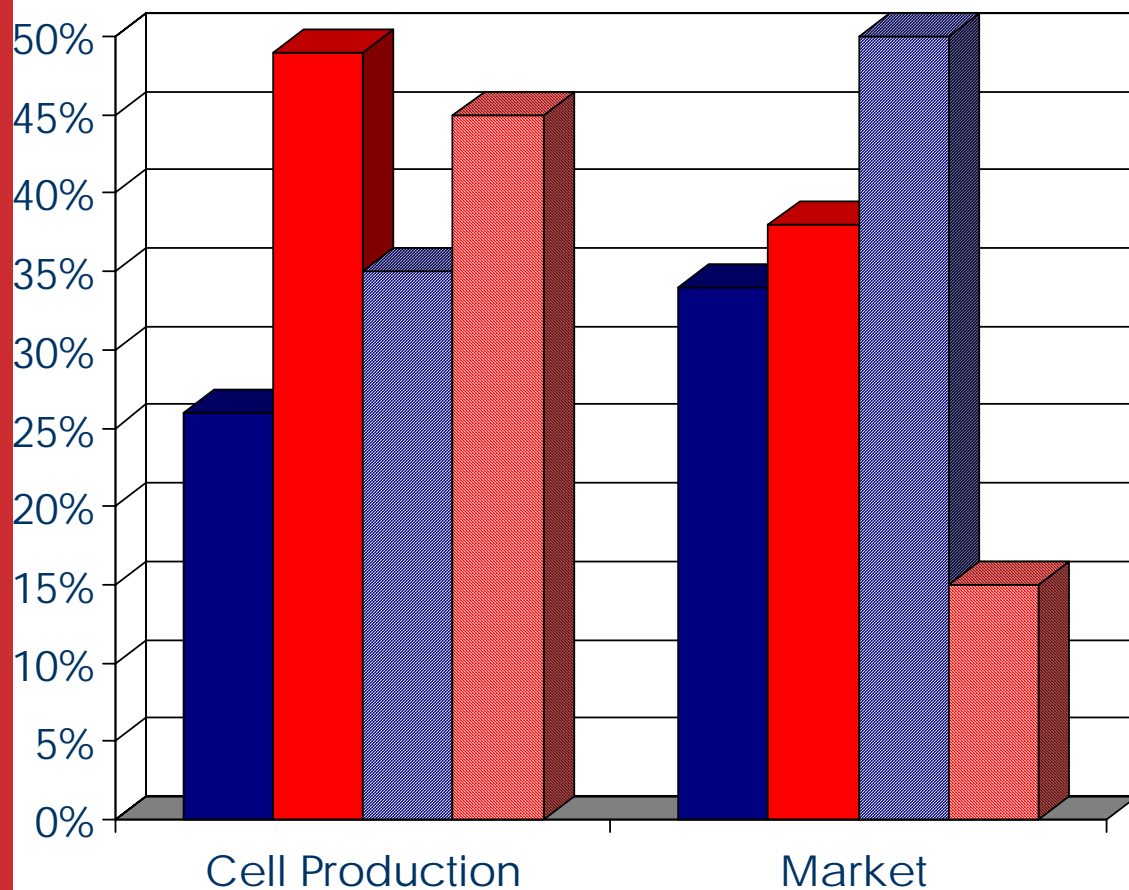
Solar cell production – Global distribution 2006



Source: Photon International

Relative shares of global figures EU vs. Japan (estimates)

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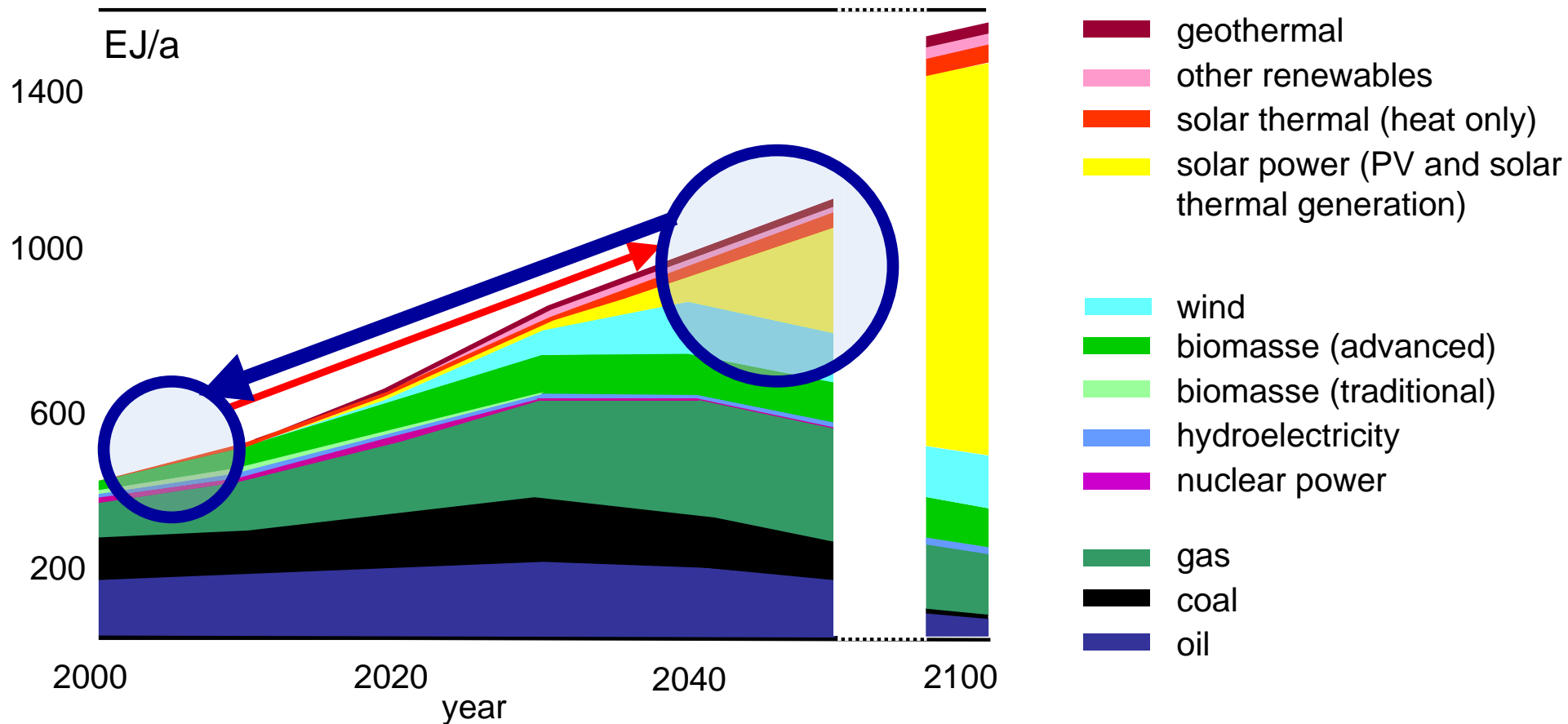
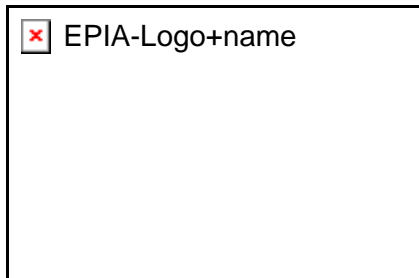
■ Europe 2003
■ Japan 2003
■ Europe 2007*
■ Japan 2007*

2007*:

Global module production	2.3 GWp
Total installed global capacity	~ 9 GWp
Installed capacity Europe	4.5 GWp

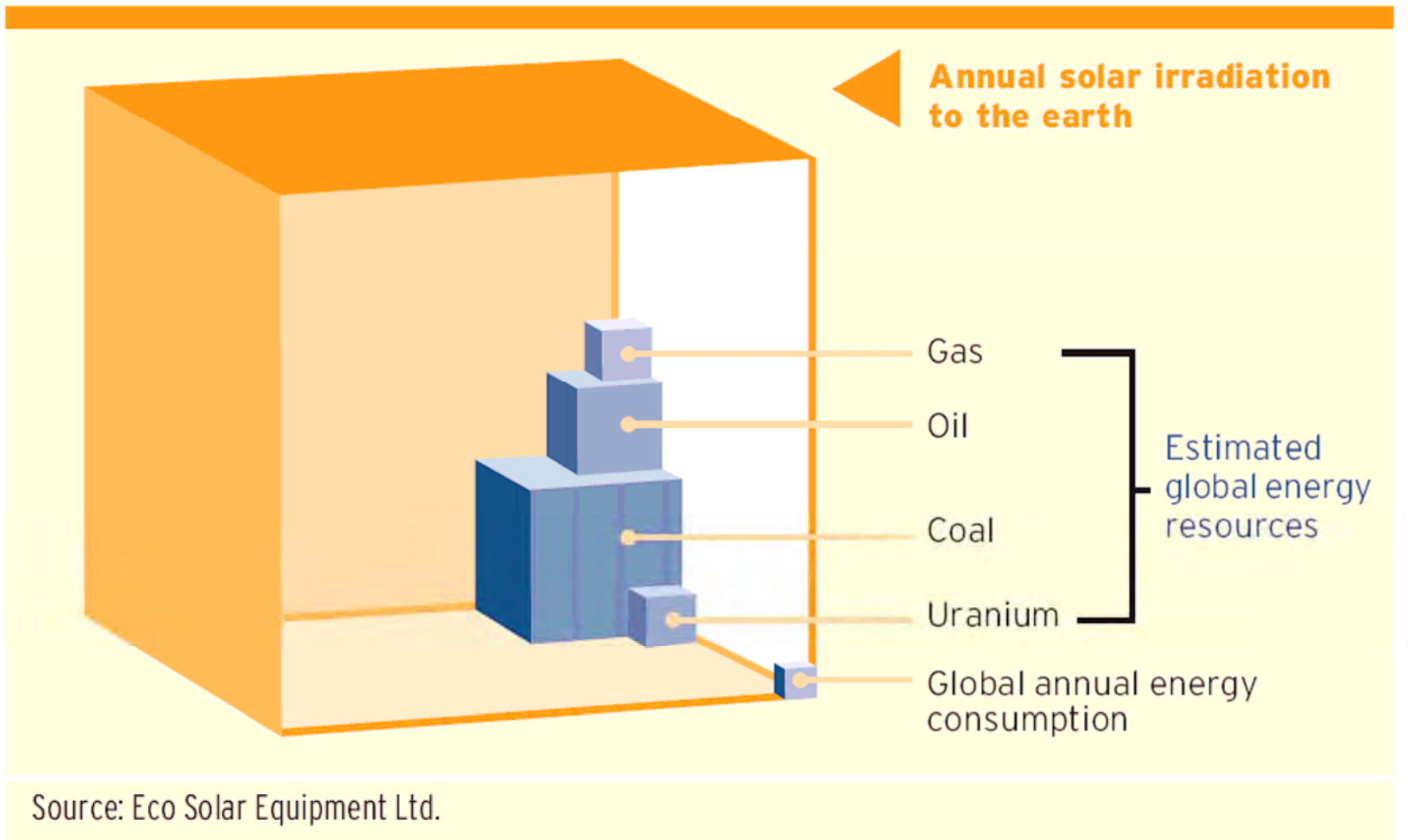
*2007: estimates

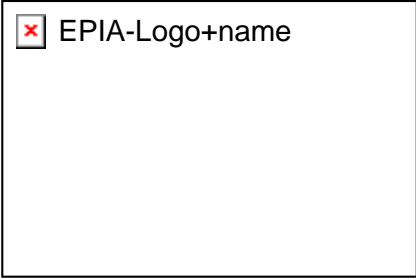
The challenge



Source: German Advisory Council on Global Change, 2003, www.wbgu.de

Finite resources

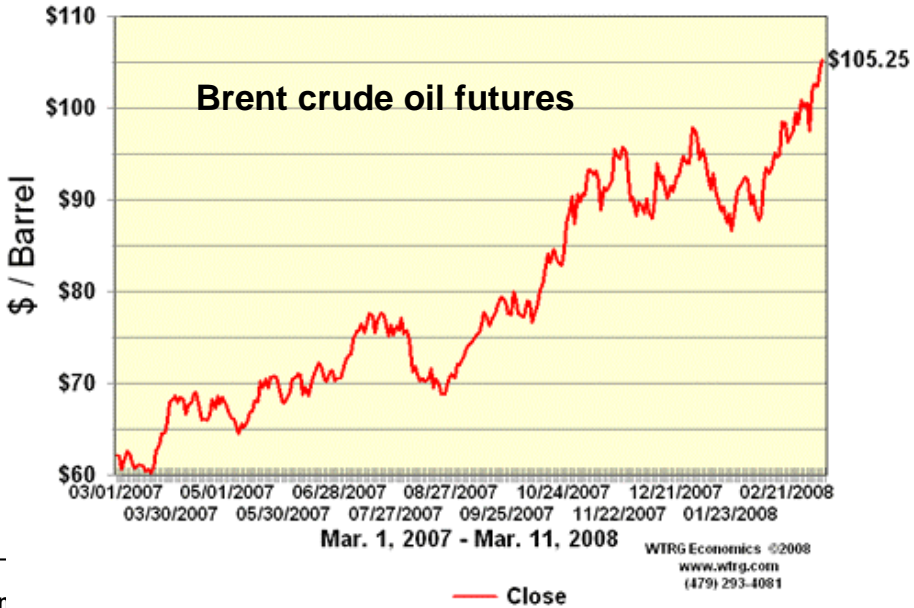




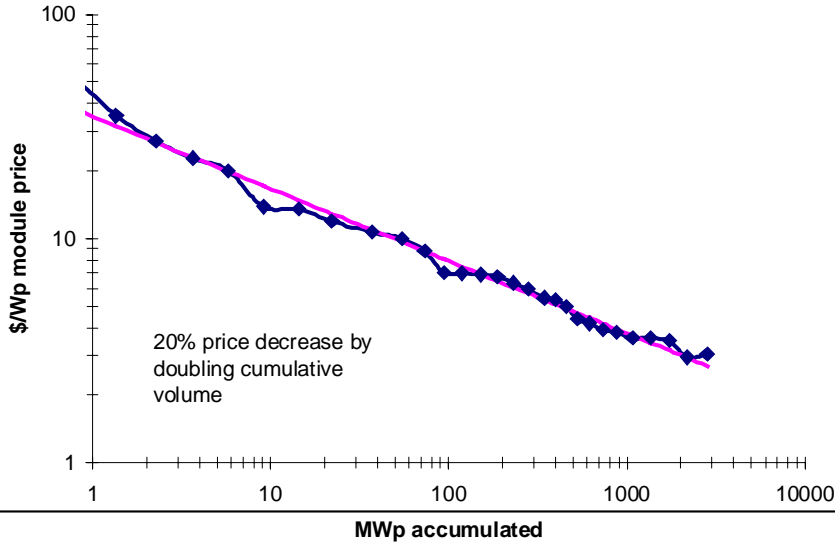
Competitiveness

- An economical perspective only
- Structural distortions favour traditional energy sources
- Ecological cost are not internalised
- Price reduction potential is not considered

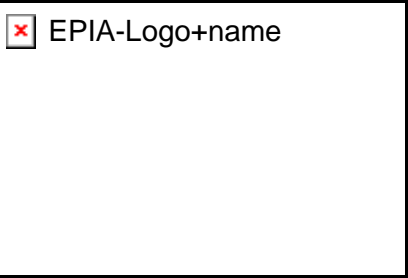
Fossil fuel price curve




PV cost reduction curve

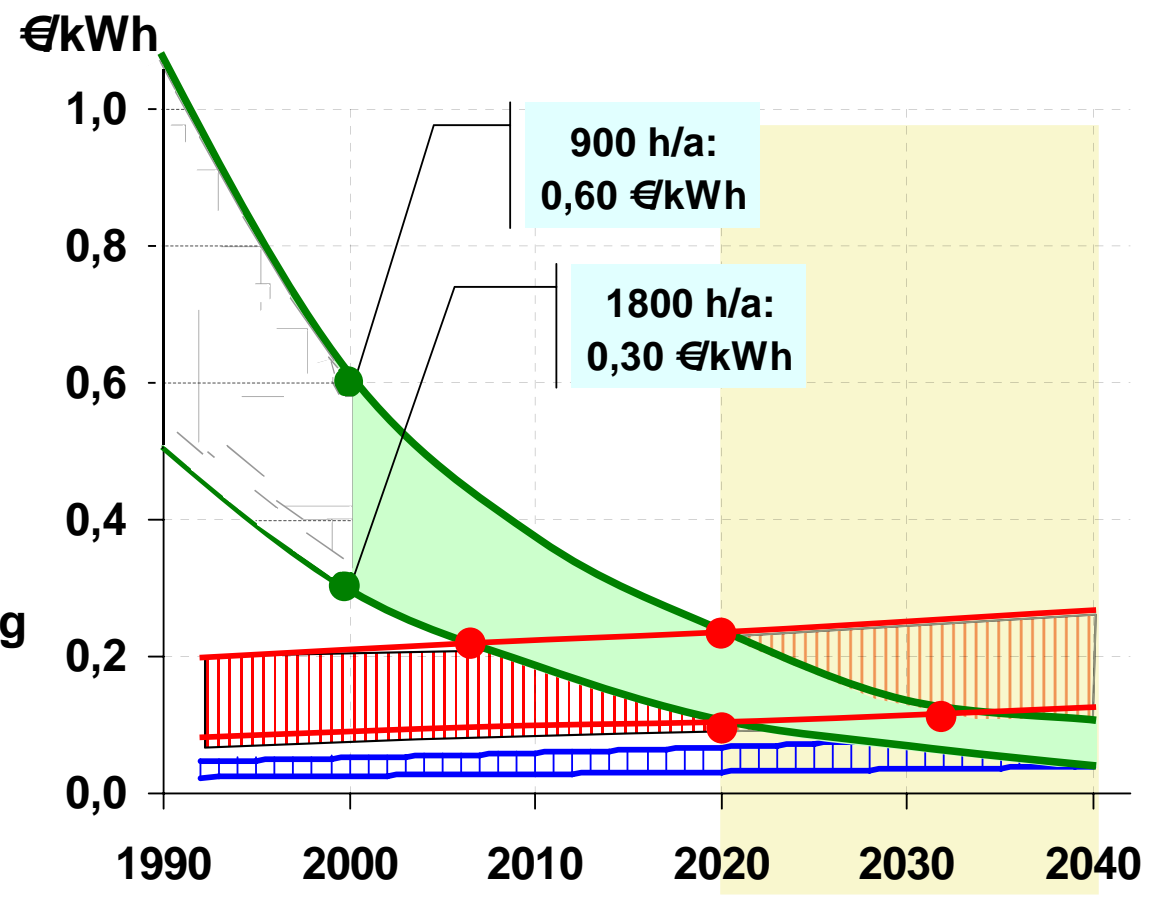


-22 May 2008



Grid Price Parity

-  Photovoltaics
-  Retail prices private and small business
-  Large power consuming industries

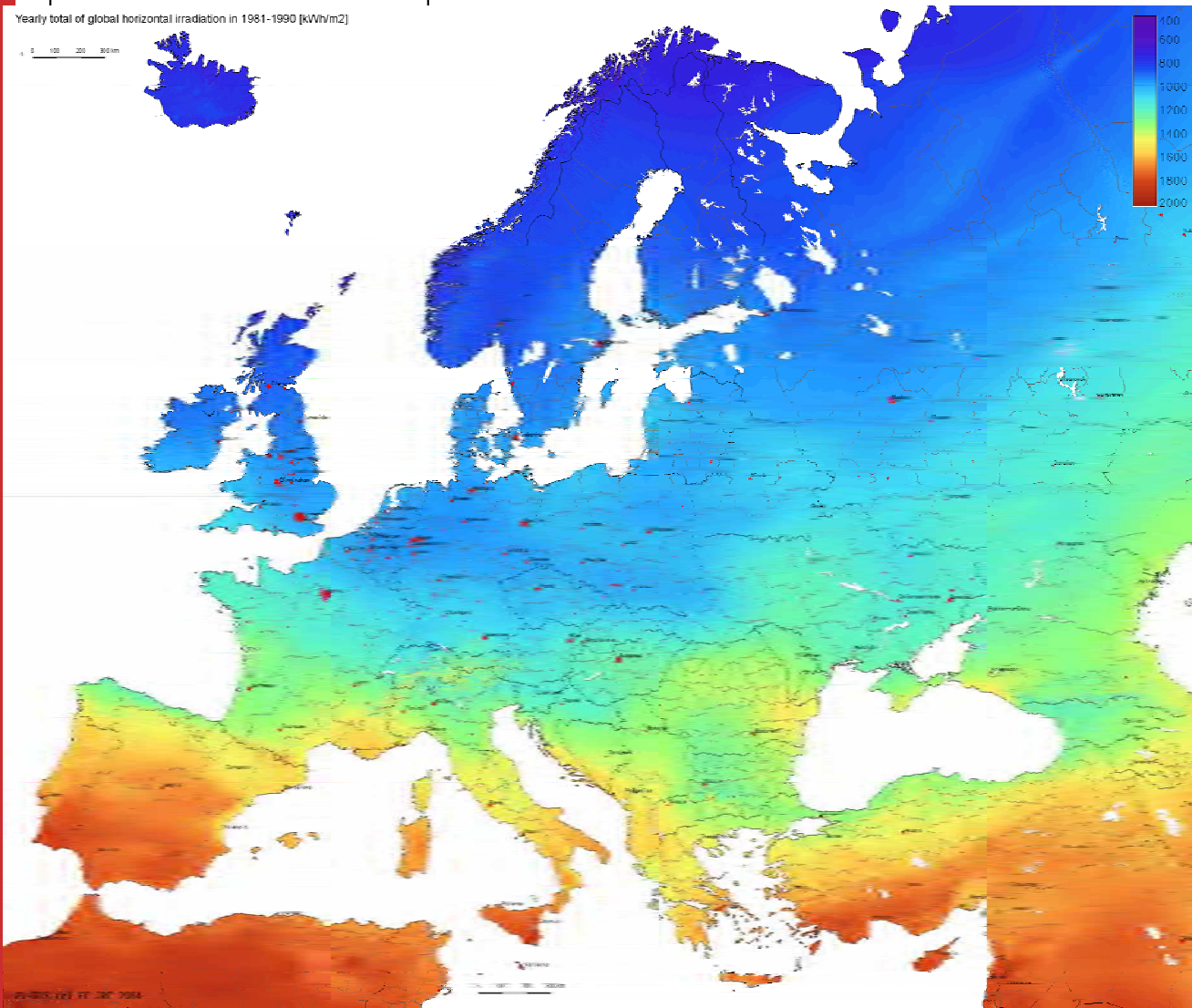


market support programs necessary: 

ref: RWE Energie AG and SCHOTT Solar GmbH, Germany

Grid parity in Europe – 2007

(lines to guide the eye)



irradiation (kWh/m ² -yr)	PV generation cost (€/kWh)
---	-------------------------------

600	0.83
-----	------

1000	0.50
------	------

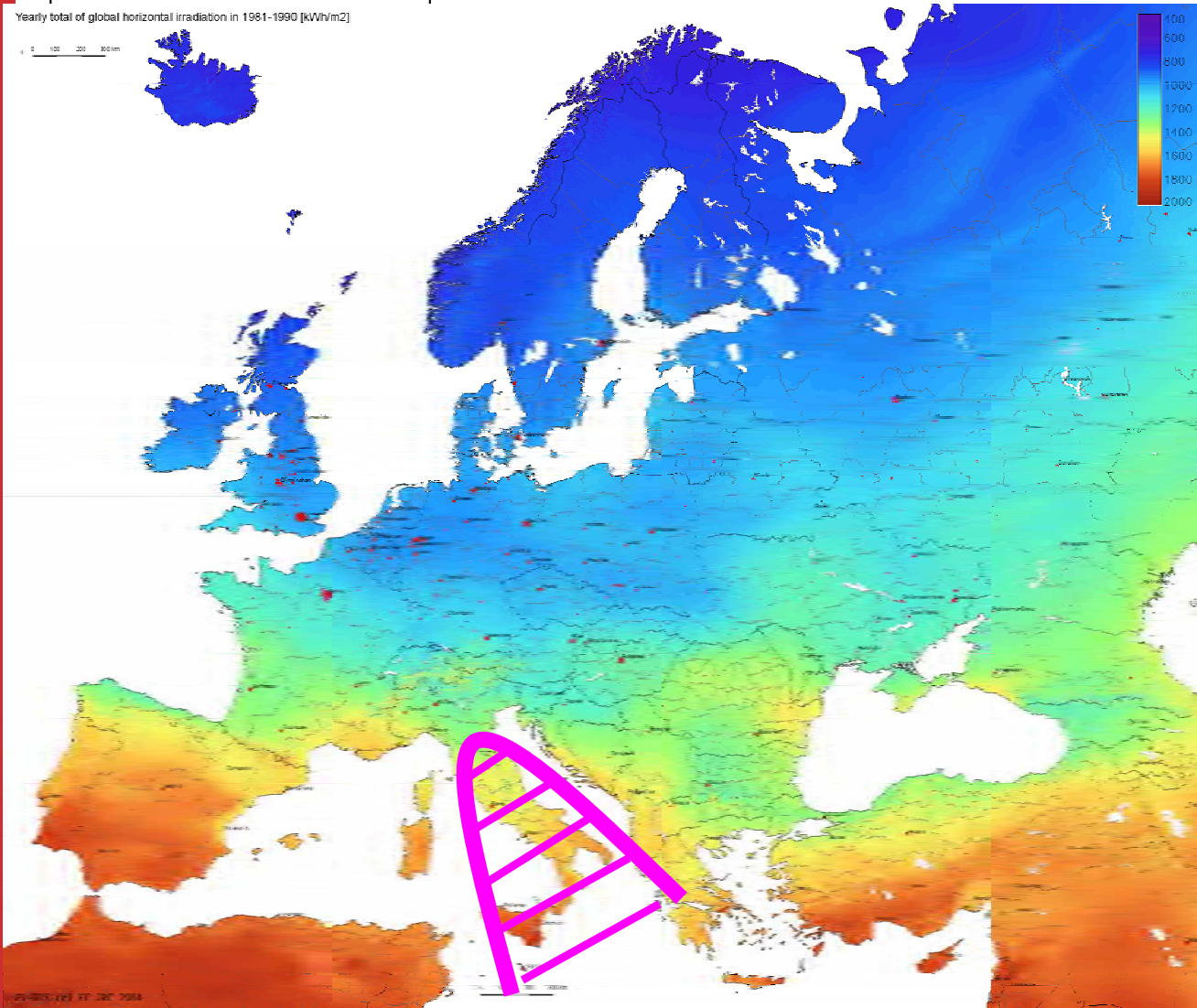
1400	0.36
------	------

1800	0.28
------	------

insolation map: Šúri M., Huld T.A., Dunlop E.D. Ossenbrink H.A., 2007. Potential of solar electricity generation in the European Union member states and candidate countries. [Solar Energy](http://re.jrc.ec.europa.eu/pvgis/), <http://re.jrc.ec.europa.eu/pvgis/>

Grid parity in Europe – 2010

(lines to guide the eye)

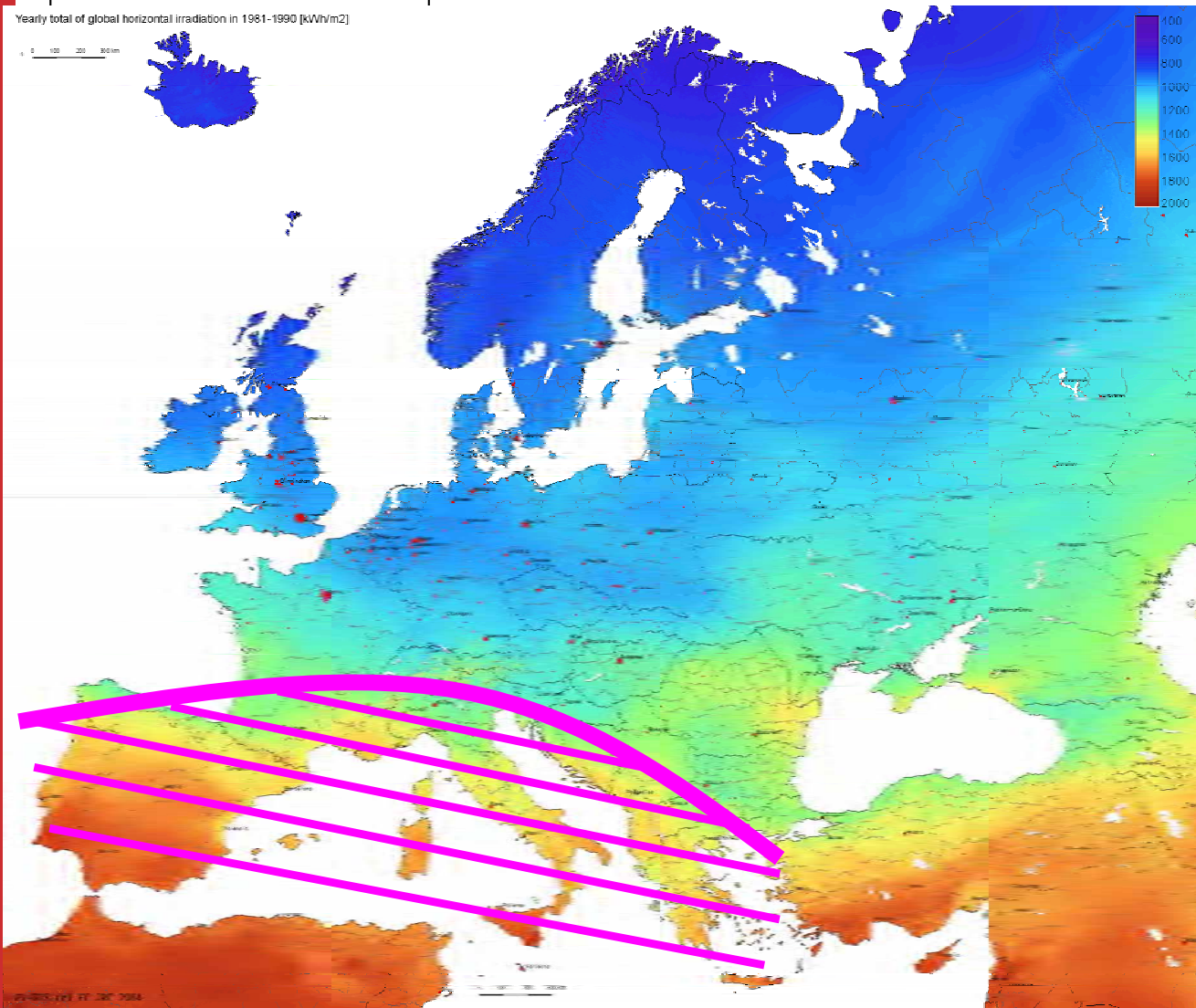


irradiation (kWh/m ² -yr)	PV generation cost (€/kWh)
600	0.50
1000	0.30
1400	0.21
1800	0.17

Grid parity in Europe – 2015

(lines to guide the eye)

Yearly total of global horizontal irradiation in 1981-1990 [kWh/m²]

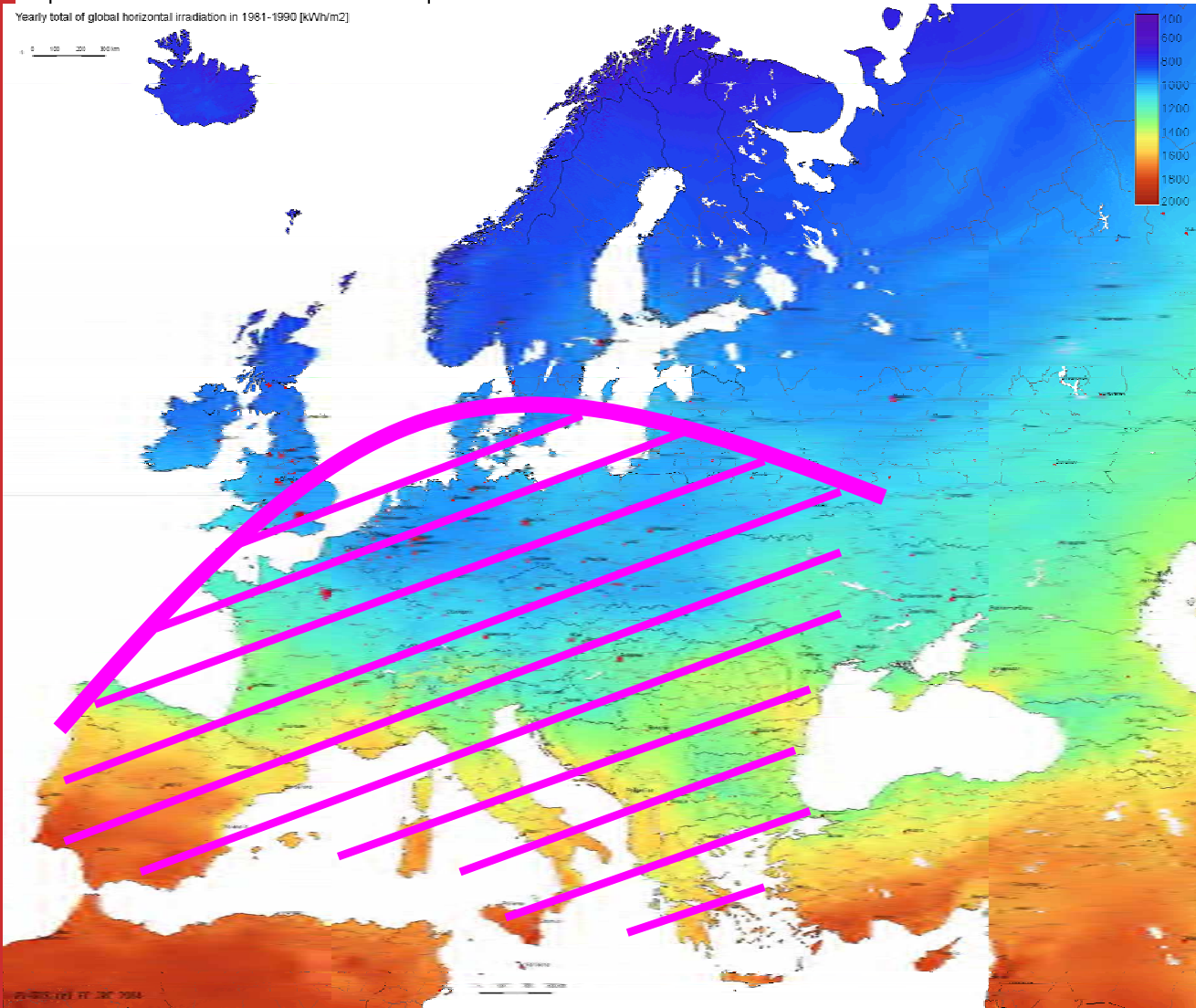


irradiation (kWh/m²-yr) PV generation cost (€/kWh)

600	0.42
1000	0.25
1400	0.18
1800	0.14

Grid parity in Europe – 2020

(lines to guide the eye)



irradiation (kWh/m ² -yr)	PV generation cost (€/kWh)
---	-------------------------------

600	0.33
-----	------

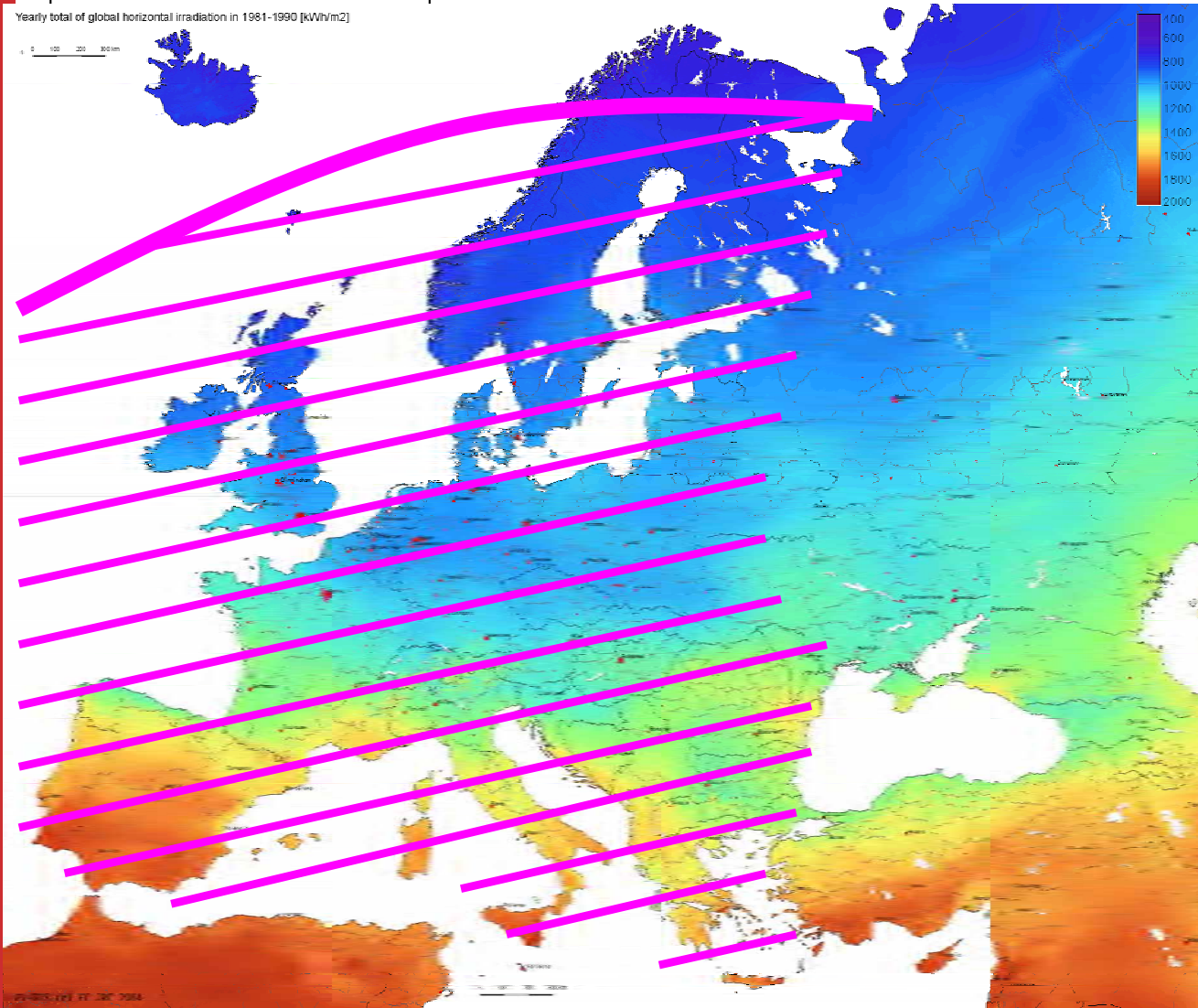
1000	0.20
------	------

1400	0.14
------	------

1800	0.11
------	------

Grid parity in Europe – 2030

(lines to guide the eye)



irradiation (kWh/m²-yr) PV generation cost (€/kWh)


600	0.17
1000	0.10
1400	0.07
1800	0.06

Maintaining today's growth rates

	Expected contribution to Europe's electricity supply
2020	2 %
2030	10%
2040	30%

Key elements for a strong deployment of PV

- **A stable political framework**
- **Technological development**
- ↓
- **Sustainable market development**
- ↓
- **A solid industry**
- ↓
- **Competitiveness and progressive independence from supporting policies**

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3. EU policy framework

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